Single axis

TS-S/TS-X/TS-P

TS series

Robot positioner　CE compliance

TS series are positioner type controllers that only performs point trace. No program is needed. Operation is simple. After setting point data, specify the point number and enter a START signal from host controller such as a PLC. Positioning or pushing operation then begins.

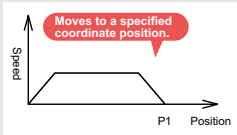
TS-S　TS-X　TS-P

Features

1 Main operation patterns

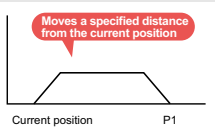
Normal operation

ABS (absolute) operation



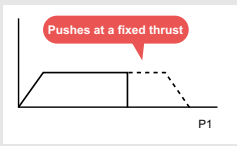
Moves to the target position relative to the origin point and completes positioning.

INC (incremental) operation



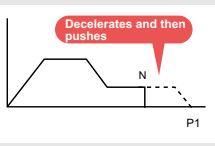
Moves from the current position just by a distance specified in point data and completes positioning.

Pushing operation



Moves while pushing at a preset push force.

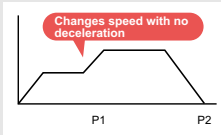
Pushing after decelerating



Pushing starts after decelerating at a distance equal to "Near width (N)" from the target position.

Merge operation

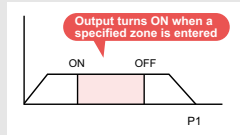
Merge operation



Moves to multiple points in succession. If different speeds were set, then the speeds are changed without decelerating and stopping to continue point-to-point operation.

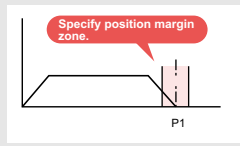
Output pattern

Zone output



Zone for external I/O output can be set for each point.

"Near width" output



"Near width" output zone can be set for each point as a position margin zone where "positioning complete" signal is to be output.

2 Detailed data can be set for each point

Settings such as acceleration, deceleration, zone output range, and position margin zone can be set for each point. Different operations can be easily specified by combining these settings with the above operation patterns.

Setting items

Setting item		Description
1	Run type	Specifies operation pattern such as ABS, INC, positioning, push, and point-to-point link.
2	Position	Specifies position or distance to move.
3	Speed	Specifies maximum speed during operation.
4	Accel.	Specifies acceleration during operation.
5	Decel.	Specifies deceleration during operation (Percentage of acceleration)
6	Push	Specifies motor current limitation during pushing operation.
7	Zone (-)	Specifies upper and lower limits of "personal zone" for each point data.
8	Zone (+)	
9	Near width	Specifies position margin zone where "near width" output should turn on.
10	Jump	Specifies next movement destination after positioning or linked destination for point-to-point operation.
11	Flag	Specifies stop mode and others.
12	Timer	Specifies the waiting time (delay) after positioning completion.

Note:Acceleration and deceleration can be set in easy-to-understand percentage (%) units (standard setup) or in SI units (custom setup) which make it easy to calculate the cycle time.

3 Maximum acceleration auto setting

Acceleration is a critical parameter that determines how long the robot can continue operating (or service life). In worst cases, setting the acceleration too high may cause the robot to breakdown after a short time.
On the TS series, the maximum acceleration is finely set by taking into account the service life span of the motor output and the guide for each robot model and payload. This eliminates any worry about setting the acceleration too high by mistake.

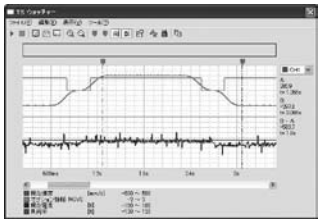
4 Full range of monitor functions

P.411

The TS-Manager developed exclusively for the TS series not only does data write, edit, backup tasks and parameter settings but also comes loaded with cycle-time, simulator, and monitor functions of all types.
A run-distance monitor for maintenance use is provided as a standard unit feature. Design emphasizes easy, user-friendly operation.

Main monitor displays

- Position
- Speed
- Current
- Load factor
- Voltage
- Temperature
- Input information
- Output information



5 LCD monitor showing easy-to-understand operation status display

TS-X　TS-P

A main-unit integrated type LCD monitor is available as an optional unit. The operation status, current position, load factor, and/or error contents can be understood at a glance.

P.405

6 Power supply voltage selectable 100V or 200V

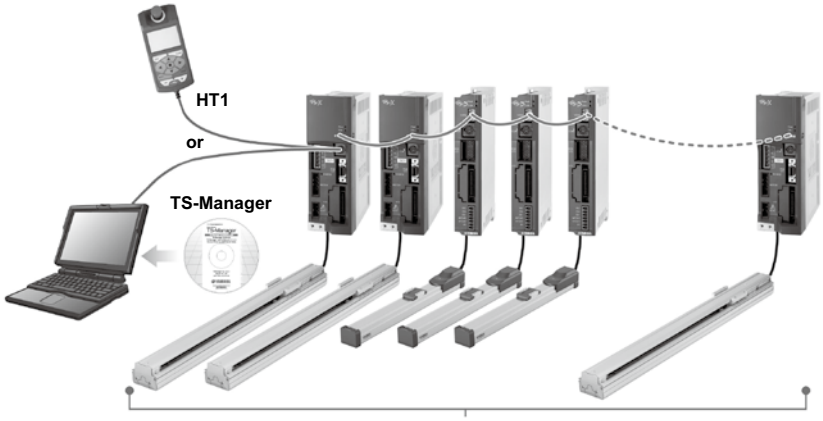
TS-X　TS-P

The power supply voltage for the TS-X and TX-P is selectable from 100V or 200V.

7 Daisy chain function

TS-S TS-X TS-P

This function allows monitoring the various data design and operation status of any controller connected via daisy chain from one PC or handy terminal.



Model Overview

Name	TS-S	TS-X	TS-P
Power	● **Main power supply** DC24V +/-10% maximum ● **Control power supply** DC24V +/-10% maximum	**AC100V specifications** Single phase 100 to 115V +/-10% maximum (50/60Hz) **AC200V specifications** Single phase 200 to 230V +/-10% maximum (50/60Hz)	
Operating method	I/O point tracing / Remote command / Operation using RS-232C communication		
Maximum number of controllable axes	Single-axis		
Position detection method	Incremental	Absolute / Incremental	Incremental / Semi-absolute
Controllable robot	Compact single-axis robot TRANSERVO	Single-axis robot FLIP-X	Linear motor single-axis robot PHASER
Support software for PC	TS-Manager		

Ordering method

● TS-S

TS-S — Controller

I/O
NP: NPN
PN: PNP
CC: CC-Link
DN: DeviceNet

● TS-X / TS-P

TSX — Controller

Controller
TSX: TS-X
TSP: TS-P

Driver: Power-supply voltage / Power capacity
105: 100V / 100W more less
110: 100V / 200W
205: 200V / 100W more less
210: 200V / 200W
220: 200V / 400 to 600W

Regenerative unit
No entry: None
R: With RGT
R: With RGU-2

LCD monitor
No entry: None
L: With LCD

Input/Output Selection
NP: NPN
PN: PNP
CC: CC-Link
DN: DeviceNet

Battery Note1
B: With battery (Absolute model)
N: None (Incremental model)

Note1. Battery can only be selected for TS-X. (Not provided for TS-P).

TS-X / TS-P specification selection table

Some specifications are automatically determined by the robot model.

● TS-X

			T4LH / C4LH	T5LH / C5LH	T6L / C6L	T9	T9H	F8 / C8	F8L / C8L	F8LH / C8LH	F10 / C10	F14 / C14	F14H / C14H	F17 / C17	F17L / C17L	F20 / C20	F20N	N15 / N15D	N18 / N18D	B10	B14	B14H	R5	R10	R20
Power supply voltage / Current sensor	TS-X	105	●	●	●	●		●	●	●	●	●								●	●	●	●	●	
		110					●						●												●
		205	●	●	●	●		●	●	●	●	●								●	●	●	●	●	
		210					●						●												●
		220												●	●	●	●	●	●						
Regenerative unit	No entry (None)				(1)	(2)				(1)	(1)	(2)	(3)		(3)	(4)					(5)			
	R (RGT)				(1)	(2)				(1)	(1)	(2)	(3)	●	(3)	(4)	●	●			(5)			

(1) Regenerative unit is needed if using in a perpendicular position and movement stroke is 700mm or more.
(2) Regenerative unit is needed if using in a perpendicular position.
(3) Regenerative unit is needed if using in a perpendicular position, using at maximum speeds exceeding 1000mm per second, or if using high leads (40).
(4) Regenerative unit is needed if using at maximum speeds exceeding 1000mm per second.
(5) Regenerative unit is needed if using at maximum speeds exceeding 1250mm per second.

● TS-P

			MR12/12D	MF7/7D	MF15/15D	MF20/20D	MF30/30D	MF75/75D
Power supply voltage / Current sensor	TS-P	105	●					
		110		●	●	●		
		205	●					
		210		●	●	●		
		220					●	●
Regenerative unit	No entry (None)		●	●	●			
	R (RGT)					●	●	
	R (RGU-2)							●

TS-S/TS-X/TS-P

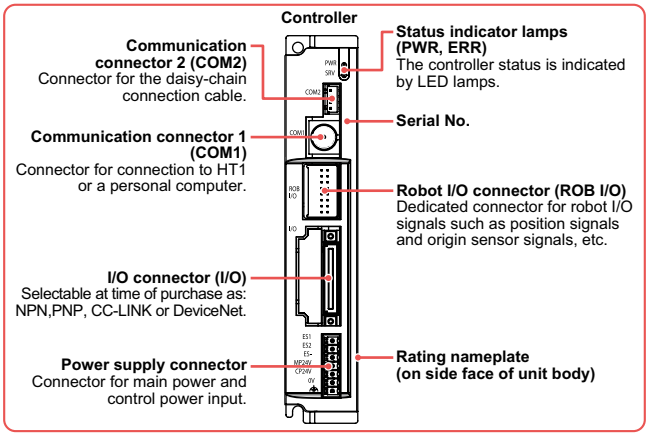
TS-S basic specifications

	Item		Model	TS-S
Basic specifications	Number of controllable axes			Single-axis
	Controllable robots			TRANSERVO series
	Power capacity			70 to 110VA
	Dimensions			W30 × H162 × D82mm
	Weight			Approx. 0.2kg
	Input power supply	Control power supply		DC24V +/-10% maximum
		Motor power supply		DC24V +/-10% maximum
Axis control	Control method			Closed loop vector control method
	Operating method			I/O point tracing (Positioning operation by specifying point number) / Remote command
	Operation types			Positioning, merge-positioning, push, and jog operations
	Position detection method			Resolver
	Resolution			20480 P/rev
	Origin search method			Incremental
Points	Points			255 points
	Point type setting			(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.
	Point teaching method			Manual data input (coordinates input), Teaching, Direct teaching
External input/output	I/O interface			Selectable from the following: NPN, PNP, CC-Link, DeviceNet
	Input			Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), jog motion - (JOG-), jog motion + (JOG+), Point number selection (PIN0 to PIN7)
	Output			Servo status (SRV-S), alarm (/ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), Point number output 0 to 7 (POUT0 to POUT7)
	External communications			RS-232C 1CH
	Safety circuit			Emergency stop input, emergency stop contact output (1 system: When the HT1 is used.)
Options	Handy terminal			HT1, HT1-D (with enable switch)
	Support software for PC			TS-Manager
General specifications	Operating temperature / Operating humidity			0°C to 40°C, 35% to 85%RH (non-condensing)
	Storage temperature/ Storage humidity			-10°C to 65°C, 10% to 85%RH (non-condensing)
	Atmosphere			Indoor location not exposed to direct sunlight. No corrosive , flammable gases, oil mist, or dust particles
	Anti-vibration			All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s^2
	Protective functions			Positioning detection error, power module error, temperature abnormality, overload, overvoltage, low voltage, gross position error

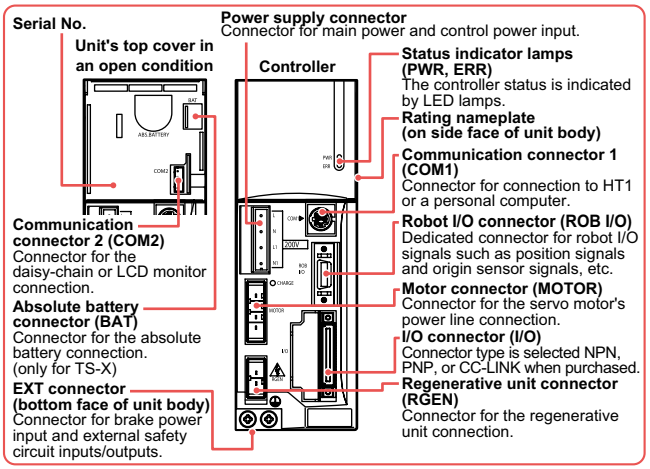
TS-X / TS-P basic specifications

	Item		Model	TS-X / TS-P				
				100V AC input		200V AC input		
Basic specifications	Driver model			TS-X105 / TS-P105	TS-X110 / TS-P110	TS-X205 / TS-P205	TS-X210 / TS-P210	TS-X220 / TS-P220
	Number of controllable axes			Single-axis				
	Controllable robots			TS-X: Single-axis robot FLIP-X series TS-P: Linear motor single-axis robot PHASER series				
	Power capacity			400VA	600VA	400VA	600VA	1400VA
	Dimensions			W58 × H162 × D131mm				W70 × H162 × D131mm
	Weight			Approx. 0.9kg				Approx. 1.1kg
	Input power supply	Control power supply		Single phase AC100 to 115V +/-10% 50/60Hz		Single phase AC200 to 230V +/-10% 50/60Hz		
		Motor power supply		Single phase AC100 to 115V +/-10% 50/60Hz		Single phase AC200 to 230V +/-10% 50/60Hz		
Axis control	Control method			Closed loop vector control method				
	Operating method			I/O point tracing (Positioning operation by specifying point number) / Remote command				
	Operation types			Positioning, merge-positioning, push, and jog operations				
	Position detection method			TS-X: Resolver with multi-rotation absolute function TS-P: Magnetic type linear scale				
	Resolution			TS-X: 16384 P/rev TS-P: 1μm				
	Origin search method			TS-X: Absolute / Incremental TS-P: Incremental / Semi-absolute				
Points	Number of points			255 points				
	Point type setting			(1) Standard setting: Set speed and acceleration in percent of the respective maximum settings. (2) Custom setting: Set speed and acceleration in SI units.				
	Point teaching method			Manual data input (coordinates input) , Teaching, Direct teaching				
External input/output	I/O interface			Selectable from the following: NPN, PNP, CC-Link, DeviceNet				
	Input			Servo ON (SERVO), reset (RESET), start (START), interlock (/LOCK) origin search (ORG), manual mode (MANUAL), jog motion - (JOG-), jog motion + (JOG+), Point number selection (PIN0 to PIN7)				
	Output			Servo status (SRV-S), alarm (/ALM), operation end (END), operation in-progress (BUSY), control outputs (OUT0 to 3), Point number output 0 to 7 (POUT0 to POUT7)				
	External communications			RS-232C 1CH				
	Power supply for brake			DC24V +/-10% 300mA (prepared by the customer)				
	Safety circuit			Emergency stop input, main power input ready output, emergency stop contact output (1 system: When the HT1 is used.)				
Options	Handy terminal			HT1, HT1-D (with enable switch)				
	Support software for PC			TS-Manager				
General specifications	Operating temperature / Operating humidity			0°C to 40°C, 35% to 85%RH (non-condensing)				
	Storage temperature / Storage humidity			-10°C to 65°C, 10% to 85%RH (non-condensing)				
	Atmosphere			Indoor location not exposed to direct sunlight. No corrosive , flammable gases, oil mist, or dust particles				
	Anti-vibration			All XYZ directions 10 to 57Hz unidirectional amplitude 0.075mm 57 to 150Hz 9.8m/s^2				
	Protective functions			Positioning detection error, power module error, temperature abnormality, overload, overvoltage, low voltage, gross position error				
	Protective structure			IP20				

TS-S part names

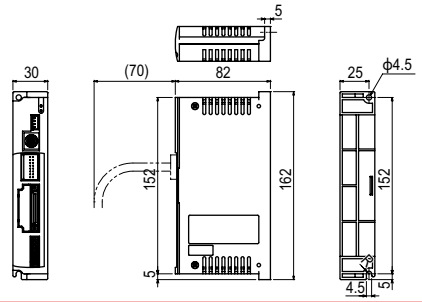

Controller
Communication connector 2 (COM2)
Connector for the daisy-chain connection cable.
Communication connector 1 (COM1)
Connector for connection to HT1 or a personal computer.
I/O connector (I/O)
Selectable at time of purchase as: NPN,PNP, CC-LINK or DeviceNet.
Power supply connector
Connector for main power and control power input.
Status indicator lamps (PWR, ERR)
The controller status is indicated by LED lamps.
Serial No.
Robot I/O connector (ROB I/O)
Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.
Rating nameplate (on side face of unit body)

TS-X / TS-P part names

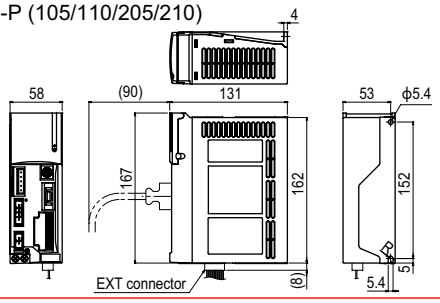

Serial No.
Unit's top cover in an open condition
Power supply connector
Connector for main power and control power input.
Controller
Status indicator lamps (PWR, ERR)
The controller status is indicated by LED lamps.
Rating nameplate (on side face of unit body)
Communication connector 1 (COM1)
Connector for connection to HT1 or a personal computer.
Communication connector 2 (COM2)
Connector for the daisy-chain or LCD monitor connection.
Robot I/O connector (ROB I/O)
Dedicated connector for robot I/O signals such as position signals and origin sensor signals, etc.
Absolute battery connector (BAT)
Connector for the absolute battery connection. (only for TS-X)
Motor connector (MOTOR)
Connector for the servo motor's power line connection.
I/O connector (I/O)
Connector type is selected NPN, PNP, or CC-LINK when purchased.
EXT connector (bottom face of unit body)
Connector for brake power input and external safety circuit inputs/outputs.
Regenerative unit connector (RGEN)
Connector for the regenerative unit connection.

TS-S / TS-X / TS-P dimensions

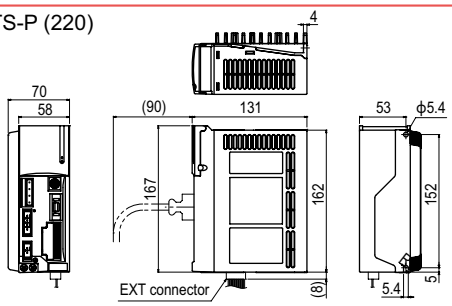
TS-S



TS-X/TS-P (105/110/205/210)



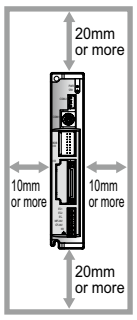
TS-X/TS-P (220)



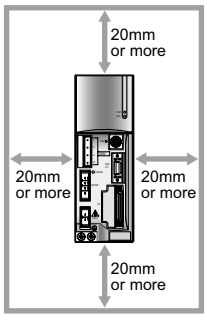
Installation conditions

- Install the TS-S/TS-X/TS-P inside the control panel.
- Install the TS-S/TS-X/TS-P on a vertical wall.
- Install the TS-S/TS-X/TS-P in a well ventilated location, with space on all sides of the TS-S/TS-X/TS-P (See fig. at right.).
- Ambient temperature : 0 to 40˚C
- Ambient humidity : 35 to 85% RH (no condensation)

TS-S



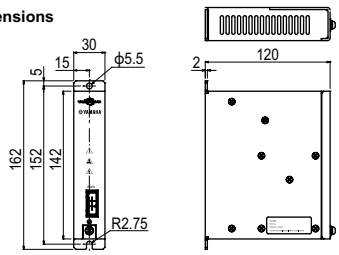
TS-X/TS-P



Regenerative unit RGT/RGU-2

Regenerative unit RGT

Dimensions



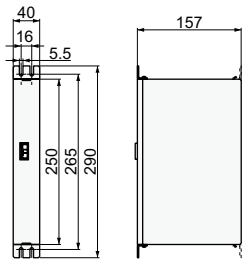
Basic specifications

Item	RGT
Model	KCA-M4107-0A
Dimensions	W30 × H142 × D118mm (Not including installation stay)
Weight	470g
Regenerative voltage	Approx. 420V or more
Regenerative stop voltage	Approx. 380V or less
Accessory	Cable for connection with controller (300mm)

Note. Always leave an empty space (gap of about 20mm) between this unit and the adjacent controller. Also, always use the dedicated cable when connecting the controller.

Regenerative unit RGU-2

Dimensions



Basic specifications

Item	RGU-2 TS-P
Model	KCA-M4107-2A (Including accessory)
Dimensions	W40 × H250 × D157mm
Weight	0.9kg
Regenerative voltage	Approx. 380V or more
Regenerative stop voltage	Approx. 360V or less
Accessory	Cable for connection with controller (300mm)

Note. Always leave an empty space (gap of about 20mm) between this unit and the adjacent controller. Also, always use the dedicated cable when connecting the controller.

Data overview

Point data and parameter data settings must be specified in order to operate a robot from a TS series controller.

Point data

The point data used in positioning operations includes items such as the “RUN type”, “Position”, and “Speed”, etc.
Up to 255 points (P1 to P255) can be registered. There are two point data setting types: “Standard setting” type that automatically defines optimal positioning simply by specifying the payload and “Custom setting” type that allows setting the speed (mm/s) and acceleration (m/s2) in SI units. Select the desired setting type according to the application.

Parameter data

Parameter data is divided into the following categories: “RUN parameters”, “I/O parameters”, “option parameters”, and “servo parameters”.

● Data structure

Data

Point data — **P1 to P255**

1	RUN type	7	Zone (-)
2	Position	8	Zone (+)
3	Speed	9	Near width
4	Accel.	10	Jump
5	Decel.	11	Flag
6	Push	12	Timer

Sets the point data to be used in positioning.
Select the desiredsetting type (“standard setting” or “custom setting”) according to the application.

(1) Standard setting
Optimum positioning is provided simply by specifying the payload.

(2) Custom setting
Speed and acceleration can be set in SI units.

Parameter data

- **K1 to K20** — RUN parameter
  Specifies parameter settings related to positioning and return to-origin operations.
- **K21 to K39** — I/O parameter
  Specifies parameter settings related to terminal assignments and I/O function selection.
- **K80 to K99** — Option parameter
  Specifies parameter settings related to options such as CC-Link, etc.
- **K40 to K79, K100 to ...** — Servo parameter
  Specifies parameter settings specified to the connected robot. These parameters are specified during initial processing.

Point data

Point data item list

P1 to P255		
Item		Description
1	RUN type	Specifies the positioning operation pattern.
2	Position	Specifies the positioning target position or movement amount.
3	Speed	Specifies the positioning speed.
4	Accel.	Specifies the positioning acceleration.
5	Decel.	Specifies the positioning deceleration (as a percentage of the acceleration).
6	Push	Specifies the electrical current limit value for “Push” operations.
7	Zone (-)	Specifies the “personal zone” output range.
8	Zone (+)	
9	Near width	Specifies the “near width” zone (distance tolerance relative to target position).
10	Jump	Specifies the next movement destination, or the next merge operation merge destination point No. following positioning completion.
11	Flag	Specifies other information related to the positioning operation.
12	Timer	Specifies the waiting time (delay) after positioning completion.

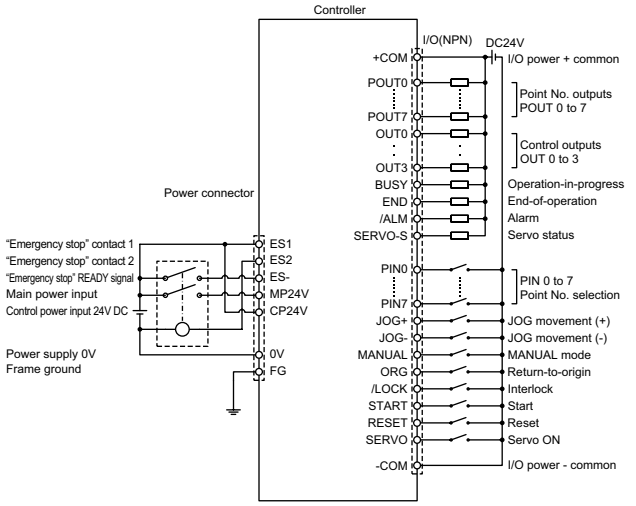
“Standard setting” and “custom setting”

There are 2 setting types for point data (“standard setting” or “custom setting”). Select the desired setting type according to the application.
The maximum number of setting points for both setting types is 255 points (P1 to P255).

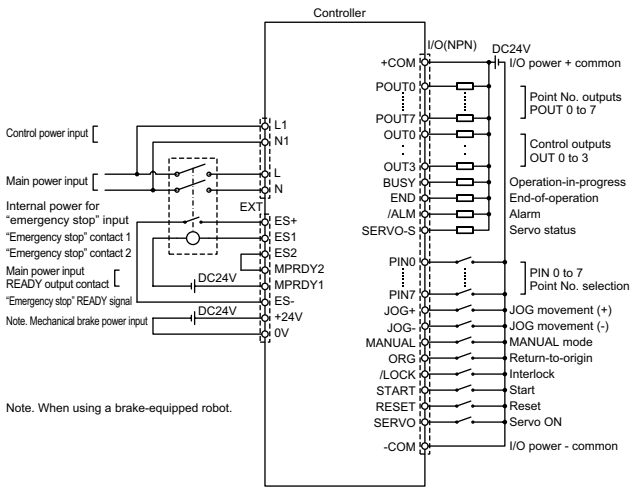
Setting Type	Description
Standard setting	Optimum positioning is provided simply by specifying the payload. This setting type is well-suited to assembly and transport applications.
Custom setting	Allows changing the speed and acceleration in SI units so the desired positioning operation can be set. This setting type is suited for machining and inspection systems.

NPN type input / output wiring diagram

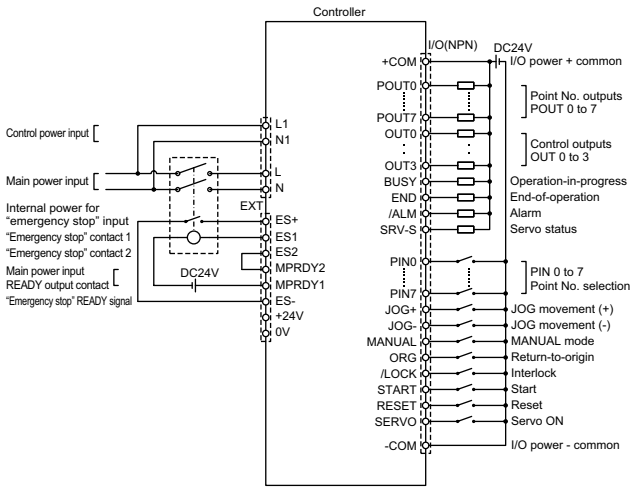
TS-S



TS-X

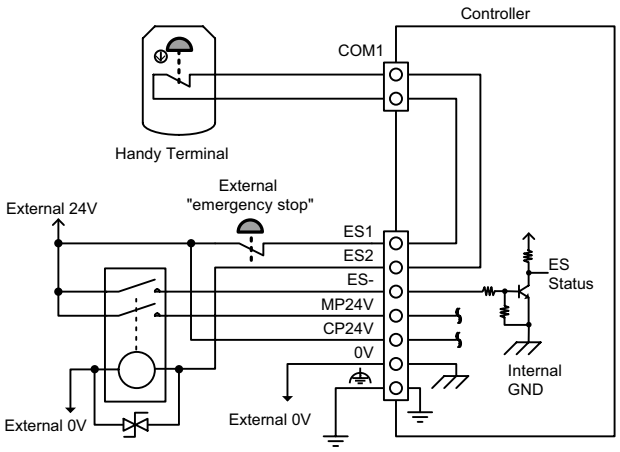


TS-P

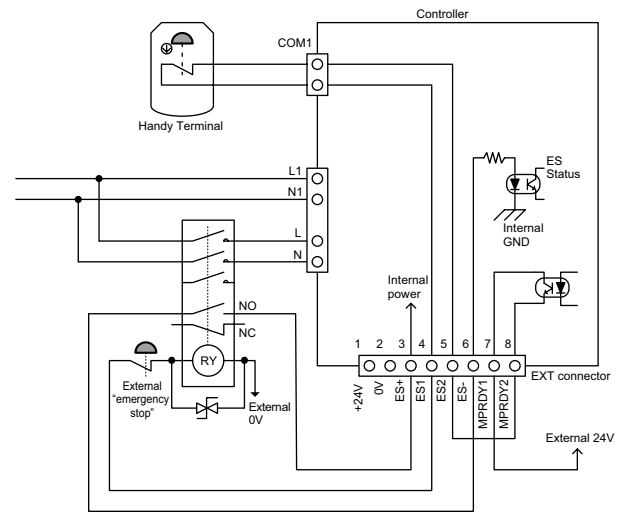


Emergency stop circuit example

TS-S (power connector and host unit connection example)



TS-X / TS-P (EXT connector and host unit connection example)



Note. Always connect a surge absorber unit to the coil on the electromagnetic contactor.

Installing an external safety circuit will satisfy safety category class 4 standards. See P.483 for more information.

I/O Specifications

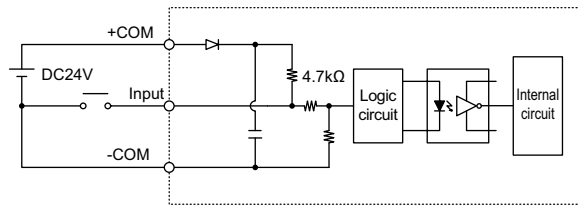
Item	Description
NPN	Input 16 points, 24VDC +/-10%, 5.1mA/point, positive common Output 16 points, 24VDC +/-10%, 50mA/point, sink type
PNP	Input 16 points, 24VDC +/-10%, 5.5mA/point, minus common Output 16 points, 24VDC +/-10%, 50mA/point, source type
CC-Link	CC-Link Ver.1.10 compatible, Remote station device (1 node)
DeviceNet	DeviceNet Slave 1 node

I/O signals (NPN / PNP)

No.	Signal Name	Description		No.	Signal Name	Description	
A1	+COM	I/O power input, positive common (24VDC +/-10%)		B1	POUT0	Outputs	Point No. outputs
A2				B2	POUT1		
A3	NC	No connection		B3	POUT2		
A4	NC			B4	POUT3		
A5	PIN0	Inputs	Point No. select	B5	POUT4		
A6	PIN1			B6	POUT5		
A7	PIN2			B7	POUT6		
A8	PIN3			B8	POUT7		
A9	PIN4			B9	OUT0		OUT0 to OUT3 assignments include: • Zone output • Personal zone output • MANUAL mode status • Return-to-origin end status • NEAR output • Movement-in-progress • Push status • Warning output
A10	PIN5			B10	OUT1		
A11	PIN6			B11	OUT2		
A12	PIN7			B12	OUT3		
A13	JOG+		JOG movement (+ direction)	B13	BUSY		Operation-in-progress
A14	JOG-		JOG movement (- direction)	B14	END		Operation-end
A15	MANUAL		MANUAL mode	B15	/ALM		Alarm
A16	ORG		Return-to-origin	B16	SRV-S		Servo status
A17	/LOCK		Interlock	B17	NC	No connection	
A18	START		Start	B18	NC		
A19	RESET		Reset	B19	-COM	I/O power input, negative common (0V)	
A20	SERVO		Servo ON	B20			

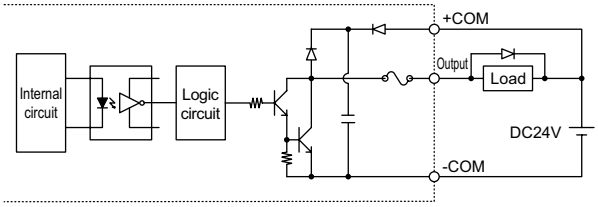
NPN type I/O circuit details

Input circuit



Type : DC input (plus common type)
Photo-coupler isolation format
Load : 24VDC +/- 10%, 5.1mA
OFF voltage : 19.6Vmin (1.0mA)
ON voltage : 4.9Vmax (4.0mA)

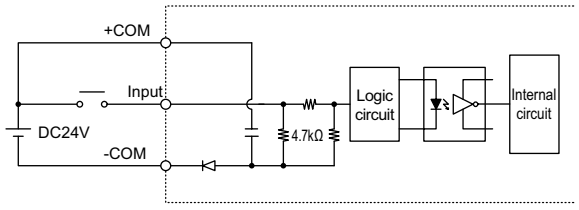
Output circuit



Type : NPN open collector output
(Minus common type)
Photo-coupler isolation format
Load : 24VDC, 50mA/point

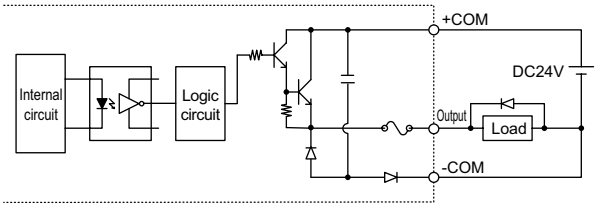
PNP type I/O circuit details

Input circuit



Type : DC input (minus common type)
Photo-coupler isolation format
Load : 24VDC +/- 10%, 5.5mA
ON voltage : 19.6Vmin (4.5mA)
OFF voltage : 4.9Vmax (1.1mA)

Output circuit



Type : PNP open collector output
(Plus common type)
Photo-coupler isolation format
Load : 24VDC, 50mA/point

Accessories and part options

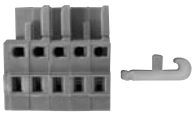
Standard accessories

Power connector

TS-S
TS-SD

Model	KCC-M4421-00

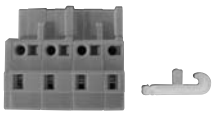
Power connector (AC100V specifications)



TS-X
TS-P

Model	KCA-M5382-00

Power connector (AC200V specifications)



TS-X
TS-P

Model	KAS-M5382-00

EXT connector

For braking power and safety circuit connections.

TS-X
TS-P

Model	KCA-M5370-00

Dummy connector

TS-S
TS-X
TS-P

Model	KCA-M5163-00

I/O cables (2m)

TS-S
TS-X
TS-P

Model	KCA-M4421-20

Absolute battery

TS-X

Model	KCA-M53G0-10

Absolute battery basic specifications

Item	Absolute battery
Model	KCA-M53G0-10
Battery type	Lithium metallic battery
Battery capacity	3.6V / 1,650mAh
Data holding time	About 1 year (in state with no power applied)
Dimensions	ϕ18 × L50mm
Weight	24g

Note. The absolute battery is subject to wear and requires replacement. If trouble occurs with the memory then remaining battery life is low so replace the absolute battery. The battery replacement period depends on usage conditions. But generally you should replace the battery after about 1 year counting the total time after connecting to the controller and left without turning on the power.

Options

Handy terminal HT1 / HT1-D

Has graphic LCD display with backlight for easy viewing.

TS-S
TS-X
TS-P

		HT1	HT1-D
Model	3.5m	KCA-M5110-0E	KCA-M5110-1E
	10m	KCA-M5110-6E	KCA-M5110-7E
Enable switch		–	3-position
CE marking		Not supported	Applicable

P.406

TS-Monitor (LCD monitor)

A liquid crystal display is integrated into this unit. It allows checking each operating state, current position, electrical current and voltage values, etc.

TS-X
TS-P

Model	For TS-X	KCA-M5119-00
	For TS-P	KCA-M5119-10

P.405

Support software TS-Manager

Besides data writing, editing and backup functions, the TS-Manager also offers cycle time simulation and various types of monitor functions.

TS-S
TS-X
TS-P
TS-SD

Model	KCA-M4966-00

TS-Manager environment

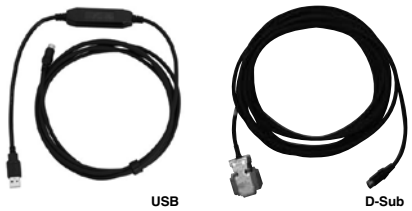
OS	Microsoft Windows 2000/ XP/Windows Vista/7
CPU	Exceeding the environment recommended by the OS being used
Memory	Exceeding the environment recommended by the OS being used
Hard disk	Vacant capacity of more than 20MB in the installation destination drive
Communication port	Serial (RS-232C), USB
Applicable controllers	TS-S / TS-X / TS-P / TS-SD

Note. Windows is the registered trademark of US Microsoft Corporation in U.S.A. and other countries.

P.411

Data cables

Communication cable for TS-Manager.
Select from USB cable or D-sub cable.



Model	USB type (5m)	KCA-M538F-A0
	D-Sub type (5m)	KCA-M538F-01

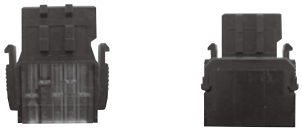
Note. USB driver for communication cable can also be downloaded from our website (driver supports VIP+, POPCOM, and TS-Manager).

Daisy chain coupler cable

TS-S
TS-X
TS-P
TS-SD

Model	KCA-M532L-00

CC-Link connector



Model	Connector Note.	KCA-M4872-00
	Jump socket	KCA-M4873-00

Note. This is a single connector type. (Insert two connectors into a branching socket.)

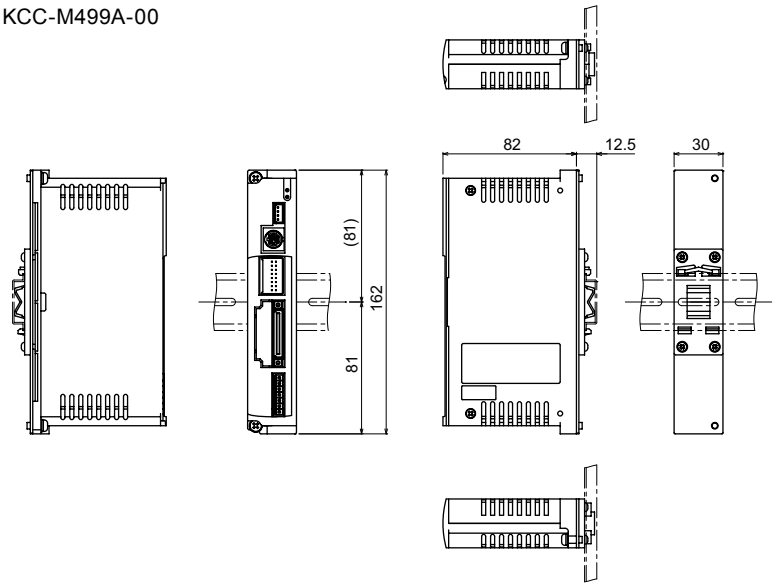
Options

DIN rail mounting bracket

TS-S

Model	For TS-S
	KCC-M499A-00

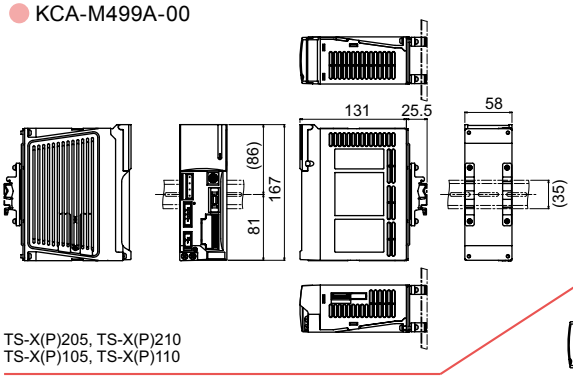
KCC-M499A-00



TS-X
TS-P

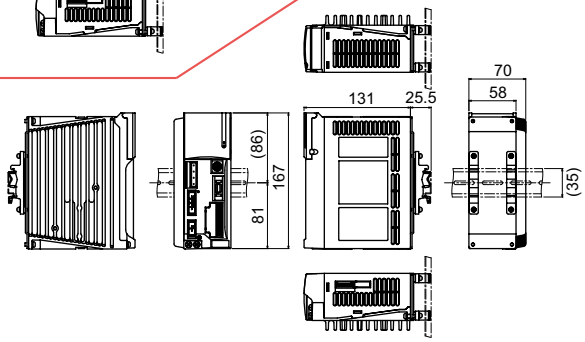
Model	For TS-X / TS-P
	KCA-M499A-00

KCA-M499A-00



TS-X(P)205, TS-X(P)210
TS-X(P)105, TS-X(P)110

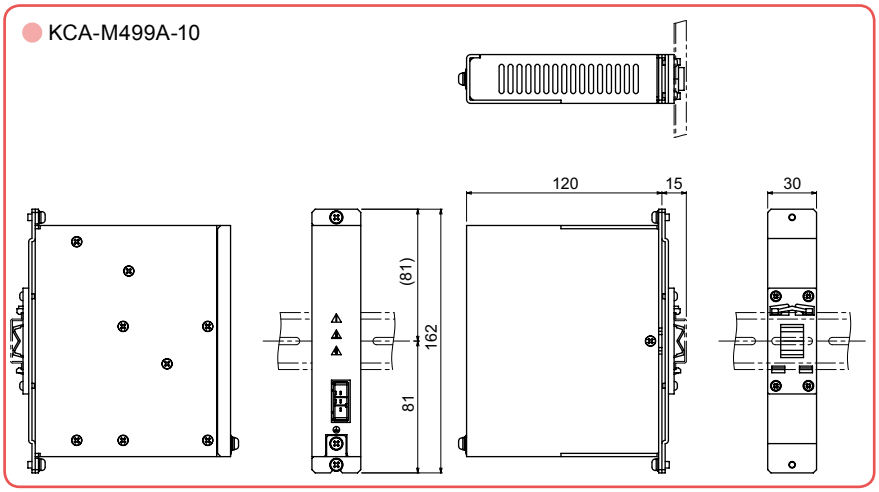
TS-X(P)220



TS-X
TS-P

Model	For TS-X / TS-P with RGT
	KCA-M499A-10

KCA-M499A-10



LCD Monitor option

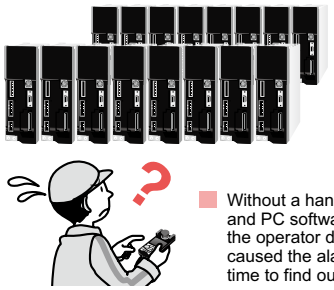
TS-Monitor

Applicable controllers ▶ TS-X TS-P

Integrated into the controller unit, the TS-monitor needs no connections to the handy terminal or PC and checks operation status, current position, error information, etc. The TS-monitor even allows the operator on the scene or service personnel to easily check the controller status. Total operating time is also displayed which is convenient to schedule maintenance periods.

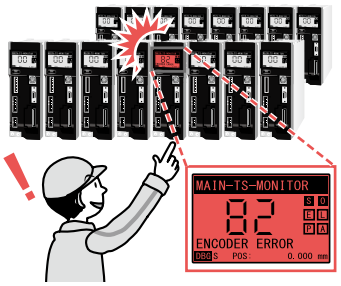
The TS Monitor Advantage

Before installing TS Monitor



- Without a handy terminal "HT1" and PC software "TS-Manager", the operator does not know what caused the alarm and it takes a time to find out the cause.

After installing TS-Monitor

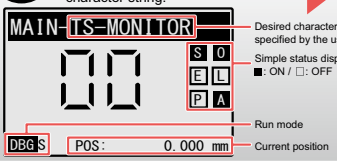


- Operator instantly knows various information without hooking to a handy terminal or PC.
- During errors the backlit display turns red and operator can see what error occurred on what controller at a glance.
- Display shows total operating time, so scheduling maintenance periods is easy.
- Backlit display is bright and easy to read even on dark panels.

Features

MAIN screen — Shows basic info

in normal operation — Displays optional name or character string.

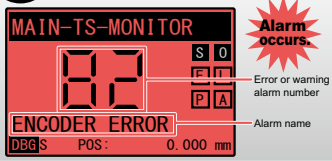


- Desired character string specified by the user.
- Simple status display ■: ON / □: OFF
- Run mode
- Current position

Error

MAIN screen — Easy to see error messages

in case of alarm — Red backlit display appears during alarms.



Alarm occurs.

- Error or warning alarm number
- Alarm name

■ Simple status display

Display	Meaning
S	Servo status
E	Emergency stop
P	Main power failure
O	Return-to-origin completion status
L	Interlock status
A	Alarm

■ Run mode

Display	Meaning
NRM	Normal mode
MON	Monitor mode
DBG	Debug mode

I/O screen — Shows I/O status

Displays input/output bit states.

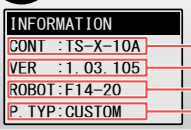
- Input signal status * Displays the status of input bit 0 to 15.
- Output signal status * Displays the status of output bit 0 to 15.

■ Bit signal correspondence table

	F	E	D	C	B	A	9	8
IN	SERVO	RESET	START	/LOCK	ORG	MANUAL	JOG-	JOG+
	7	6	5	4	3	2	1	0
	PIN7	PIN6	PIN5	PIN4	PIN3	PIN2	PIN1	PIN0
	F	E	D	C	B	A	9	8
OUT	SRV-S	/ALM	END	BUSY	OUT3	OUT2	OUT1	OUT0
	7	6	5	4	3	2	1	0
	POUT7	POUT6	POUT5	POUT4	POUT3	POUT2	POUT1	POUT0

INFORMATION screen — Shows machine info

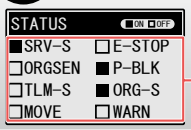
Displays the connected robot and version.



- Controller name
- Controller software version
- Robot name
- Point type

STATUS screen — Shows status info

Info such as error status or movement status is all at a glance.



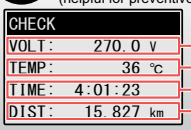
Status display ■: ON, □: OFF

■ Status display

Display	Meaning
SRV-S	Servo status
ORGSEN	Origin sensor
TLM-S	Push status
MOVE	Move status
E-STOP	Emergency stop
P-BLK	Main power failure
ORG-S	Return-to-origin completion status
WARN	Warning output

CHECK screen — Shows operating status

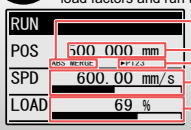
Displays total drive distance (helpful for preventive maintenance).



- Internal voltage of controller
- Temperature inside controller
- Total startup time of controller (Day : Hour : Minute)
- Total movement distance of robot

RUN screen — Shows operation status and data

Info includes position, speed, load factors and run type.

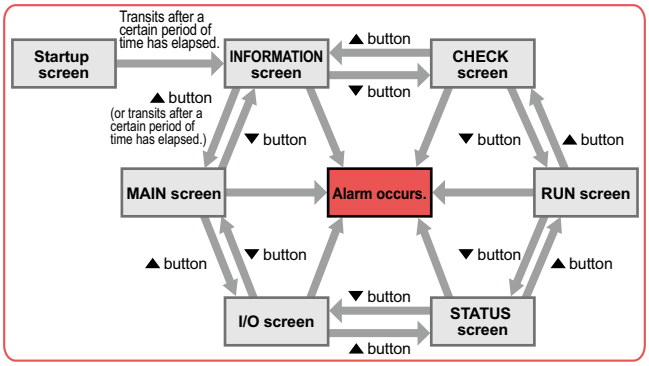


- Run type
- Robot current position
- Run point
- Robot operation speed
- Load rate

■ Run type

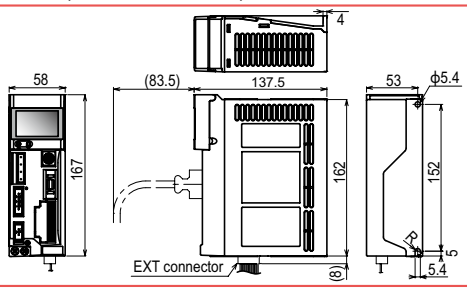
Display	Meaning
HOLD	Servo is off or robot is stopping
ABS	ABS
INC	INC
ABS MERGE	ABS merge operation
INC MERGE	INC merge operation
ABS PUSH	ABS push operation
INC PUSH	INC push operation
ABS->PUSH	ABS deceleration push operation
INC->PUSH	INC deceleration push operation
ORG	Return-to-origin

Screen transition

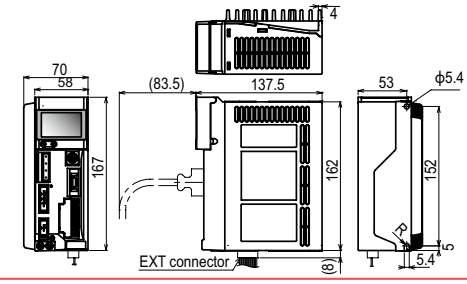


Dimensions

TS-X/TS-P (105/110/205/210) with TS-Monitor



TS-X/TS-P (220) with TS-Monitor



TS-Monitor basic specifications

Model	TS-X	KCA-M5119-00
	TS-P	KCA-M5119-10
Effective display size		W40.546 × H25.63mm
Screen display		Graphic monochrome LCD
Backlight		Blue and red, 2-color LCD
Contrast adjustment		5 steps
Number of display dots		128 × 64 dots

Handy terminal

HT1/HT1-D

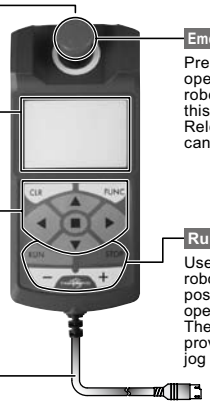
Applicable controllers ▶ TS-S TS-X TS-P

This Handy Terminal is a device that can perform any operation such as robot manual operation, point data edit, teaching, and parameter setting, etc. Has graphic LCD display with backlight for easy viewing.

HT1 / HT1-D basic specifications

Name		HT1	HT1-D
External view			
Applicable controllers		TS-S / TS-X / TS-P	
Model	Japanese specifications	KCA-M5110-0J(3.5m) KCA-M5110-6J(10m)	KCA-M5110-1J(3.5m) KCA-M5110-7J(10m)
	English specifications	KCA-M5110-0E(3.5m) KCA-M5110-6E(10m)	KCA-M5110-1E(3.5m) KCA-M5110-7E(10m)
Display		Dot matrix monochrome display (with backlighting) 32 characters × 10 lines	
Operation keys		Mechanical switch	
Emergency stop button		Normally closed contact point (with lock function)	
Enable switch		-	3-position
Safety connector		-	15 pin D-sub connector (male)
CE marking		Not supported	Applicable
Operating temperature		0°C to 40°C	
Operating humidity		35% to 85%RH (non-condensing)	
Dimensions		W88 × H191 × D45mm (Emergency stop button not included.)	
Weight		260g (not including cable)	300g (not including cable)
Cable length		3.5m / 10m	

Part names and function



Strap holder
Attaching a short strap or necklace strap here prevents dropping the HT1 while operating it or installing it onto equipment.

LCD screen
This is a liquid crystal display (LCD) screen with 32 characters × 10 lines (pixel display), showing the operation menus and various types of information.

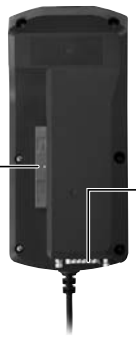
Data edit keys
Use these keys to select menus and edit various data.

Connector cable
This cable connects to the controller. One end of this cable is terminated with an 8-pin MD connector (male). Plug this cable into the COM1 connector on the controller front panel.

Emergency stop button
Pressing this button during operation immediately stops robot movement. To release this button, turn it clockwise. Releasing this button also cancels emergency stop.

Run/stop keys
Use these keys to operate the robot for teaching or positioning, or to stop operation.
The ⊖ and ⊕ keys are also provided to move the robot in jog mode.

HT1-D rear side



Enable switch (only on HT1-D)
This switch is effective for use with remote safety circuits. This switch cuts off the circuit when pressed or released but allows circuit operation when in the middle position.

Safety connector (only on HT1-D)
Use with remote safety circuits triggered by the emergency stop button or enable switch.

Field network system with minimal wiring

NETWORK

Applicable controllers ▶ TS-S TS-X TS-P

Network modules CC-Link

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, TS-S / TS-X / TS-P.
- As connection of the robot system and the sequencer requires only one (4-wire) dedicated cable, it is possible to save wiring of the entire system, which contributes to efficient wiring work, reduction of installation and maintenance costs, etc.
- 16 input/outputs usable as I/O.
- Operation occurs as a CC-Link remote device station, on a one-unit to one-station basis.
- Remote commands can read or write point data and load each type of status.

Basic specifications for network modules CC-Link

Item	Network modules CC-Link
Applicable controllers	TS-S / TS-X / TS-P
Version supporting CC-Link	Ver. 1.10
Remote node type	Remote device node
Number of occupied nodes	1 node
Node number setting	1 to 64
Communication speed setting	10Mbps, 5Mbps, 2.5Mbps, 625Kbps, 156Kbps
No. of CC-Link inputs/outputs	Input 16 points , Output 16 points
Shortest distance between nodes[Note1]	0.2m or more
Overall extension distance[Note1]	100m/10Mbps, 160m/5Mbps, 400m/2.5Mbps, 900m/625Kbps, 1200m/156Kbps
Monitor LED	L RUN, L ERR, SD, RD

Note 1. These values apply when a cable that supports CC-Link Ver.1.10 is used.

Network modules DeviceNet

- Option unit with networking functions that can be incorporated in YAMAHA robot controllers, TS-S / TS-X / TS-P.
- As connection of the robot system and the sequencer requires only one (4-wire) dedicated cable, it is possible to reduce wiring of the entire system, which contributes to efficient wiring work, reduction of installation and maintenance costs, etc.
- 16 input/outputs usable as I/O.
- Operate as slave stations, with each unit occupying 6 input and 6 output channels.
- Remote commands can read or write point data and load each type of status.

Basic specifications for network modules DeviceNet

Item		Network modules DeviceNet
Applicable controllers		TS-S / TS-X / TS-P
Applicable DeviceNet specifications		Volume 1 Release2.0/Volume 2 Release2.0
Device type		Generic Device (device number 0)
Number of occupied CH		Input 6ch, Output 6ch
MAC ID setting		0 to 63
Communication speed setting		500Kbps, 250Kbps, 125Kbps
DeviceNet inputs/outputs		Input 16 points, Output 16 points
Network length	Overall extension distance	100m/500Kbps, 250m/250Kbps, 500m/125Kbps
	Branch length	6m or less
	Overall branch length	39m or less/500Kbps, 78m or less/250Kbps, 156m or less/125Kbps
Monitor LED		Module, Network

Touch operator interface

Pro-face GP4000 Series

Applicable controllers ▶ TS-S TS-X TS-P

Free download of the program file from the Pro-face home page
http://www.proface.com

Connecting GP4000 Series made by Pro-face to Robot Positioner, TS-S,TS-X,TS-P enables you to use a lot of functions as well as basic operations on Touch Operator Interface.

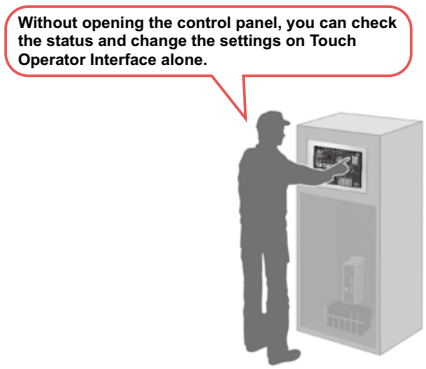
Features

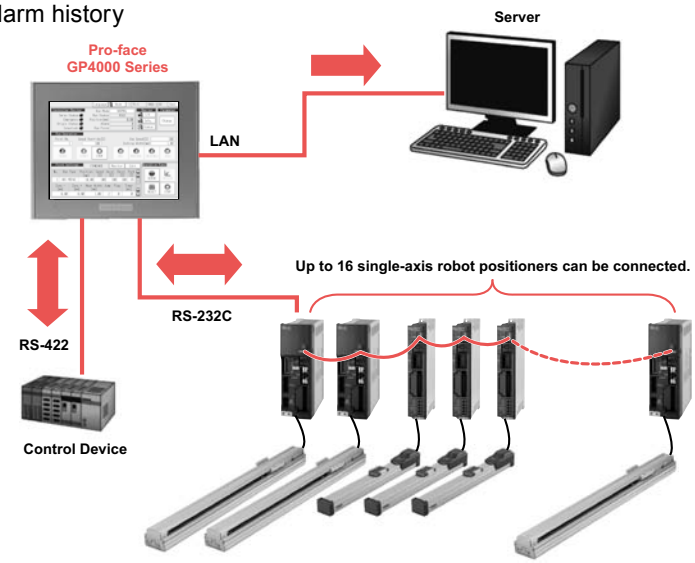
1 Can easily check a state and change settings.

- Check the status (the current position, speed etc)
- Basic operations such as Jog operation, inching operation, return to origin, error reset etc.
- Set, edit, or back up point data and parameters
- Check triggered alarms and detailed descriptions of alarm history

2 Supports 3 languages

- Supports Japanese, English, and Chinese (simplified, traditional)

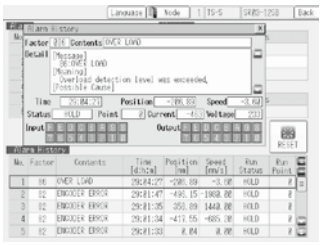




Screen details

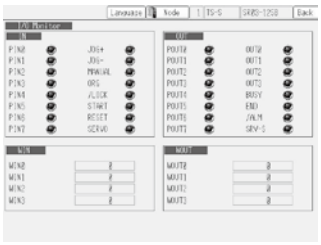
Diagnostic Screen

When a problem occurs, you can check the detailed descriptions of the alarm history, so you can understand easily what the cause is.



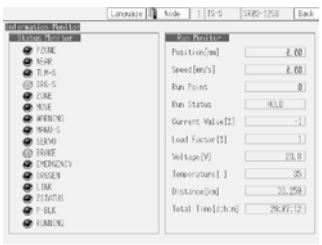
I/O Monitor Screen

Displays both general I/O and dedicated I/O together. You can quickly check the I/O status.



Information Monitor Screen

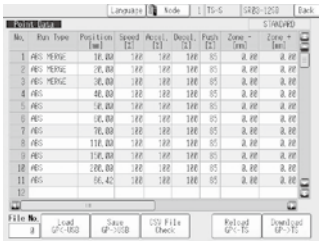
The screen can display the robot status and the operation status. You can check immediately the robot condition.



Position Data Editing Screen

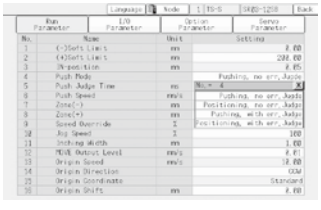
You can edit and back up point data (255 points).[Note]

Note. Settings for it and a USB storage required.



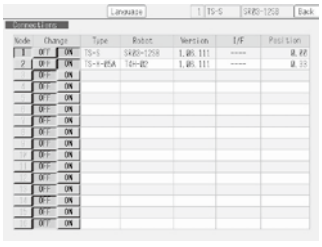
Parameter Editing Screen

While checking parameters of robot positioners in the list, you can set them with the pull-down menu.



Connecting Selection Screen

You can connect up to 16 robot positioners simultaneously with GP-Pro EX Ver.3.0 multi-axis feature.



Contact; Pro-face TEL:06-6613-1101 FAX:06-6613-5888